

S/058/61/000/010/069/100
A001/A101

24.7700

AUTHOR: Perlin, Yu.Ye.

TITLE: On the theory of quantum transitions of a localized electron into polaron states

PERIODICAL: Referativnyy zhurnal. Fizika, no. 10, 1961, 237, abstract 10E22
("Uch. zap. Kishinevsk. un-t", 1960, v. 55, 95 - 105)

TEXT: The author considers the process of thermoionization of F-centers in alkali-halide crystals accompanied by quantum transitions of electrons from the ground state of the F-center into polaron state. Non-adiabaticity operator is assumed as a perturbation causing the transition. An essential difference of the effective field in which polaron moves from the Coulomb field is taken into account. It is assumed that kinetic energy of polaron is considerably less than the energy of phon, due to which circumstance quasi-classical wave functions of polaron are used in continuous spectrum. Quantum transitions are assumed only in the s -state of this spectrum. Probability of thermoionization W is calculated on assumption that electrons interact only with longitudinal optical oscillations, dispersion of oscillation frequencies being neglected. An explicit analytical

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On the theory of quantum transitions ...

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A001/8101

expression of W as a function of temperature has been found. In particular, at high temperatures W depends exponentially on inverse temperature. The preexponential factor for KCl and NaCl crystals is of the order of 10^9 sec^{-1} . ✓B

M. Krivoglaz

[Abstractor's note: Complete translation]

Card 2/2

S/058/61/000/012/025-112
A058/A101

AUTHOR: Perlin, Yu. Ye.

TITLE: Concerning the probability of nonradiative transition in the discrete spectrum of impurity centers

PERIODICAL: Referativnyy zhurnal, Fizika, no. 12, 1961, 196, abstract 12V27x.
("Uch.zap. Kishinevsk. un-t", 1960, no. 55, 107-112)

TEXT: The probability of multiphonon nonradiative transition in an F-center was calculated on the assumption that electrons interact strongly with the optical but weakly with the acoustic branches of lattice vibrations. Acoustic interaction is taken into account as a transition-generating perturbation. The obtained formulae enable one to numerically evaluate the transition probability if the electron wave functions of the impurity center are known and the temperature dependence of thermal transition has been analyzed.

[Abstracter's note: Complete translation]

Card 1/1

PERLIN, Yu.Ye.

Consideration of the polaron effect in the theory of
multiphonon thermal ionization. Fiz. tver. tela 2 no.2:
242-254 F '60. (MIRA 14:8)

1. Kishinevskiy gosudarstvennyy universitet.
(Ionic crystals--Defects) (Thermionic emission)

84815
S/181/60/002/008/050/052/XX
B006/B070

24.3500
AUTHOR:

Perlin, Yu. Ye.
Impurity Fluorescence in Crystals

TITLE:

PERIODICAL: Fizika tverdogo tela, 1960, Vol 2, No 8, pp 1915-1927

TEXT: The aim of the author was to generalize the theory of resonance fluorescence of atoms to the case of electrons which are localized near lattice defects and interact with the phonon field. The author assumes that the optical electrons of an impurity center of a dielectric are less strongly bound than the intrinsic electrons of the substance. Therefore, the light absorption band of the pure crystal lies in a region of the spectrum which is transparent for the impurities. Using the method of adiabatic approximation, in which the intrinsic electrons form a "fast" subsystem, the Hamiltonian \hat{H}_0 of the crystal is obtained as a function only of the configuration variables of the impurity electrons and the phonon field interacting with them. The energy of the intrinsic electrons of the dielectric for a fixed configuration of a "slow" subsystem is contained in the potential energy of the latter. If the electron-phonon

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Impurity Fluorescence in Crystals

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interaction is not small, the Hamiltonian \hat{H}^0 can be treated again in adiabatic approximation in which the localized electrons can be considered to be a "fast" subsystem with respect to the lattice vibrations. The formulas for the approximate wave function of \hat{H}^0 and the approximate eigenvalue of \hat{H}^0 were derived by S. M. Pekar in Ref. 1. The possibility of radiationless transitions between the states considered is ignored. If the crystal is irradiated with light of a frequency inside the impurity absorption band, luminescence may appear. The appearance of this luminescence is described in three stages. The first and the third were considered by Pekar. This luminescence is regarded as phosphorescence. It can also be regarded as fluorescence and looked upon as a single quantum transition: A photon $\hbar\Omega_0$ is absorbed and, simultaneously, another photon $\hbar\Omega$ is emitted. The excited states of electrons and lattice play here the role of virtual states. Now, generalizing Weisskopf's theory the author considers three types of states: the initial state ψ_1 of the impurity electrons, the virtual state in which the impurity ions are in the excited state ψ_2 , and the final state in which the electrons are again in the state ψ_1 . The theoretical study of the fluorescence probability and the spectral characteristics of the fluorescence lead to the following con-

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clusions: 1) The spectrum of fluorescence excitation coincides with that of the absorption of light; 2) A Stokes shift appears: The fluorescence maximum shows a red shift at $\Delta\Omega = \omega_a$ compared to the absorption maximum; 3) The fluorescence curve represents a reflection of the impurity absorption band in the straight line $\Omega = \Omega_{21}$. The theoretical results are compared with the experimental results (Ref 9) on the infrared fluorescence of the F-centers in KCl (Table) and NaCl at 77°K. The author thanks Professor S. I. Pekar for interest and discussions, and Professor A. I. Ansel'm and Professor L. E. Gurevich for discussions. L. N. Ovander is mentioned. There are 1 table and 9 references: 6 Soviet, 1 US, 1 German and 1 British.

ASSOCIATION: Kishinevskiy gosudarstvennyy universitet (Kishinev State University)

SUBMITTED: January 19, 1960

Card 3/3

84816

S/181/60/002/008/051/052/XX
B006/B070

24.3500

AUTHOR:

Perlin, Yu. Ye.

TITLE:

Consideration of Non radiative Transitions in the Theory
of Impurity Fluorescence

PERIODICAL: Fizika tverdogo tela, 1960. Vol 2, No 8, pp 1928-1955

TEXT: This paper is in continuation of two previous papers (Refs 1,2) in which a study was made of the fluorescence in a crystal caused by its irradiation with light of a frequency in the impurity absorption band. It was assumed that the impurity absorption band lies in a spectral region which is transparent to the pure substance, and that the optical electrons of an impurity center interact strongly with the crystal lattice vibrations. The fluorescence was regarded as a single quantum transition (absorption of a photon $\hbar\Omega_0$ and a simultaneous emission of a photon $\hbar\Omega$). The mathematical method developed in Ref 2 is a generalization of Weisskopf's perturbation theory to strong electron-photon interaction, and permits a calculation of the spectral distribution curve. However, the non-radiative transitions between the virtual excited states and the

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Consideration of Non-radiative Transitions S/181/60/002/008/051/052/XX
in the Theory of Impurity Fluorescence B006/B070

final state of the system were not taken into account and, therefore, the quantum yield was obtained as one. In fact, however, the quantum yield is less than one on account of the non-radiative transitions and absorption events in which the total photon energy is converted into heat. In the present paper, the results of Refs. 1 and 2 are used to calculate the quantum yield of the impurity fluorescence, taking the non-radiative transitions into account. This is done by means of a perturbation operator V . It is assumed that the zone of normal oscillations of the crystal may be divided into two classes: "optical" oscillations which are in strong interaction with the localized electrons, and "acoustic" oscillations which interact with them weakly. Four states are considered: 1) the initial state; 2) the virtual state (electrons are in an excited state); 3) the final state (transition from the virtual state to the initial state with emission of radiation); 4) the final state (transition from the virtual state to the initial state without radiation). The formulas obtained by means of the terms of Ref. 2 show that the spectral relations derived in the earlier papers continue to hold in the present case also; only the quantum yield η is less than one. The temperature dependence of η is found to be given by $\eta = 1/(1+BT)$, which agrees qualitatively with experimental

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Consideration of Non-radiative Transitions
in the Theory of Impurity Fluorescence

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observations. A. Ye. Marinchuk is mentioned There are 10 references.
6 Soviet, 2 German, 1 US, and 1 British

ASSOCIATION: Kishinevskiy gosudarstvennyy universitet (Kishinev State
University)

SUBMITTED: January 19, 1960

Card 3/3

84685

243600 2209, 1158, 1144 S/051/60/009/005/006/019
E201/E191
AUTHORS: Perlin, Yu. Ye., and Palistrant, M. Ye.
TITLE: On the Theory of Photoionization of F-Centres ²¹
PERIODICAL: Optika i spektroskopiya, 1960, Vol. 9, No. 5, pp 608-614
TEXT: Continuous states of the F-centre spectrum are interpreted by the present authors as polarons moving in the screened Coulomb field of an anion vacancy. The probability of photoionization by transitions from the F-centre ground state is calculated. It is shown that due to participation of phonons in phototransitions, the dependence of the ionization probability on the frequency of absorbed light is an asymmetrical curve with a maximum. The long-wavelength end of this curve is similar to the Pekar curve (Ref. 5) for phototransitions in the discrete spectrum; the short-wavelength end of the authors' curve falls more smoothly than the Pekar curve. With increase of temperature the magnitude of the ionization probability maximum decreases and the half-width of the probability curve increases. ✓
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84685

S/051/60/009/005/006/019
E201/E191

On the Theory of Photoionization of F-centres

The calculated frequency dependences of the ionization probability for a KCl crystal at 76 °K (curve 1) and 294 °K (curve 2) are given in a figure on page 614. Curve 1 is very similar to an experimental dependence reported by Inchausti (Ref. 1).

There are 1 figure and 5 references: 4 Soviet and 1 English.

SUBMITTED: February 26, 1960

Card 1/2

PERLIN, Yu. Ye., Doc Phys-Math Sci -- "Quantum transitions
in local centers of crystals." Len, 1961. (Acad Sci USSR.
Phys-Tech U im A. F. Ioffe) (KL, 8-61, 225)

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PERLIN, Yu.Ye.; KOVARSKIY, V.A.

Theory of impurity-sensitized scattering of slow polarons. Fiz.tver.
tela 3 no.4:1031-1034 Ap '61. (MIRA 14:4)

1. Kishinevskiy gosudarstvennyy universitet i Kishinevskiy sel'sko-
khoz'yaystvennyy institut.

(Electrons--Scattering)

(Color centers)

27293

S/181/61/003/008/023/034

B109/B202

24.3500

AUTHORS: Perlin, Yu. Ye., Marinchuk, A. Ye., Kon, L. Z.
TITLE: Theory of the thermoluminescence of impurity crystals
PERIODICAL: Fizika tverdogo tela, v. 3, no. 8, 1961, 2401-2412

TEXT: The thermoluminescence which occurs upon the radiationless transition of an electron from a metastable level to an excited level of a luminescence center is studied by the perturbation theory of Wigner-Weisskopf. The authors attempted to explain the temperature and frequency dependences of thermoluminescence intensity. As an example, the authors discuss the decoloration of the F' band which is due to a tunnel effect and is accompanied by a luminescence of the F-band. The calculation is made with the aid of an adiabatic model of a localized electron. The lattice spectrum is assumed to consist of two branches: optical vibrations whose interactions with the electron are calculated in zero-th approximation, and acoustic vibrations which interact only weakly with the electrons. This interaction is regarded as perturbation and causes radiationless electron transitions. If thermoluminescence is regarded as a second-order quantum transition and if
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Theory of the thermoluminescence ...

the excited electron-vibrational states are considered as virtual states, the theory of Wigner-Weisskopf generalized by Yu. Ye. Perlin (FTT, II, 1915, 1960 and FTT, II, 1928, 1960) can be used; the solution of the time-dependent Schrödinger equation is formulated as superpositions a) of the wave function Ψ_0 of the initial state which is described by the wave function ψ_3 of the metastable level and the occupation numbers n_x^0 , N_f^0 , b) of the wave function Ψ_v of the virtual states with the electron wave function ψ_2 of the unstable level and the occupation numbers n_x , N_f , c) of the wave function Ψ_r of the final states with the electron wave function ψ_1 of the ground state and the occupation numbers n_x' , N_f' . The corresponding probability amplitudes are c_0 , c_v , c_r whose values can be calculated from the Schrödinger equation.

The probability $w(\Omega)$ of the emission of a photon $\hbar\Omega$ can be found by taking the statistical mean value of $|c_r|^2$ $t \rightarrow \infty$ in terms of the occupation numbers of the photon oscillators in the initial state. Using the results and the denotation of A. Ye. Marinchuk, Yu. Ye. Perlin (Izv. Mold. fil. AN SSSR, 2, (69), 57, 1960) the authors obtain

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Theory of the thermoluminescence ...

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$$\begin{aligned} \omega(\omega) = & \frac{|W_{\omega}(0)|^2}{\hbar^2 \omega^3} \exp\left(-\frac{a_{21} + a_{11}}{2} \operatorname{cth} \frac{\beta}{2}\right) \sum_j |A_j|^2 N_j^0 \int_{-\infty}^{\infty} d\tau \times \\ & \times \exp\left[i\tau\left(p_0 - \frac{\omega'}{\omega}\right) + \frac{a_{21}}{2 \operatorname{sh} \frac{\beta}{2}} \cos\left(\tau - \frac{i\beta}{2}\right)\right] \int_{-\infty}^{\infty} dt \times \\ & \times \exp\left[itr + \frac{a_{21}}{2 \operatorname{sh} \frac{\beta}{2}} \cos\left(t - \frac{i\beta}{2}\right)\right] \int_0^{\infty} dt' \times \\ & \times \exp\left[-\frac{\gamma}{\omega} t' - \frac{2ib}{\operatorname{sh} \frac{\beta}{2}} \operatorname{sh}\left(\frac{i\tau + \beta}{2}\right) \sin \frac{t}{2} \cos t'\right], \end{aligned} \quad (2.14)$$

where

$$a_{11} = \sum_i (q_{i3} - q_{i1})^2; \quad b = \sum_i (q_{i3} - q_{i1})(\bar{q}_{i1} - q_{i2}) \quad (2.15),$$

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Theory of the thermoluminescence ...

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$$r\omega = \Omega - \Omega_{21} \quad (2.16),$$

$$a_{32} = \sum_x (q_{x3} - q_{x2})^2 \quad (1.13),$$

$$A_f = \sqrt{\frac{h}{2Df\omega_f}} \int \psi_s(r) V_f(r) e^{i(\theta, r)} \psi_s(r) dr, \quad (1.12),$$

D - crystal density, L^3 - crystal volume. If $\rho(\Omega)$ is the spectral frequency density then

$$\int \omega(\Omega) \rho(\Omega) d\Omega = \sum_{r=-\frac{\omega_0}{2}}^{\infty} w_r \quad (2.19)$$

follows from (2.14), ... the emission spectrum consists of equidistant lines. For w_r the authors give the following expression:

$$w_r = \exp\left(-\frac{a_{21}}{2} \operatorname{cth} \frac{\beta}{2}\right) \sum_{k=-\infty}^{\infty} (-1)^k I_k^2(\xi) I_{r+k}\left(\frac{a_{21}}{2 \operatorname{sh} \frac{\beta}{2}}\right) e^{-(r+k)\frac{\beta}{2}}. \quad (2.32)$$

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Theory of the thermoluminescence ...

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B109/B202

This formula describes the frequency dependence of the intensity of thermoluminescence. For $T \rightarrow 0$, (2.32) changes into the formula for the probability of the light emission of an excited center after phonon relaxation. This formula was obtained by S. I. Fekar (ZhETF, 22, 641, 1952). For $T \neq 0$ the spectrum of the emitted radiation is a superposition of the curves for $T = 0$. It is bell-shaped and has a maximum at $\nu = -\nu_1/2$.

The given formulas are applied to the case of thermoluminescence which occurs in a colored alkali halide crystal during the reaction $F' \rightarrow F$. Table 1 gives the quantities $|J_F|^2$, a_{32} and b for KCl as a function of the distance R between the two centers; $a_{21} = 44.6$, $p_0 = -7$. Table 2 gives the decay rate $\bar{\Gamma}$ of the centers as a function of R . Hence, at lower temperature thermal ionization is less important. Thus, only the tunnel effect may cause a decoloration of the F' band. With increasing temperature the conditions are changed: According to A. G. Cheban (Opt. i spektr., X, 495, 1951) the probability of thermal ionization at $T = 300^\circ\text{K}$ is already approximately 10^9 sec^{-1} and is thus of the same order of magnitude as the tunnel effect. There are 1 figure, 2 tables, and 11 references: Soviet

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Theory of the thermoluminescence ...

S, 1961/01/003/006/023/034
B1C9/B2C1

and 2 non-Soviet.

ASSOCIATION: Kishinevskiy gosudarstvennyy universitet Institut fiziki i matematiki Mold. fil. AN SSSR (Kishinevskiy State University Institute of Physics and Mathematics AS USSR)

SUBMITTED: March 16, 1961

R, Å...	$(T_f)^*$	α_m	(δ)
5	0.48	30.6	7.53
7	0.21	43.2	9.05
10	0.062	57.1	8.13
15	$0.32 \cdot 10^{-2}$	70	7.2
20	$0.37 \cdot 10^{-4}$	73.1	7.0
30	$0.59 \cdot 10^{-8}$	80	6.9

Table 1

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R, Å...	\bar{F}, cm^{-1} ($T = 30^\circ \text{K}$)	\bar{F}, cm^{-1} ($T = 300^\circ \text{K}$)
5	$2.3 \cdot 10^{12}$	$2.0 \cdot 10^{13}$
7	$2.0 \cdot 10^{10}$	$1.8 \cdot 10^{11}$
10	$4.3 \cdot 10^7$	$0.96 \cdot 10^{11}$
15	$5 \cdot 10^4$	$0.89 \cdot 10^9$
20	$49 \cdot 10$	$0.78 \cdot 10^7$
30	$1.0 \cdot 10^{-3}$	$0.65 \cdot 10^3$

Table 2

S/051/60/008/03/018/038

E201/E191

AUTHOR: Perlin, Yu.Ye.

TITLE: On the Problem of the Energy Spectrum of an F-Centre in
the Continuum Theory

PERIODICAL: Optika i spektroskopiya, 1960, Vol 8, Nr 3,
pp 386-393 (USSR)

ABSTRACT: Within the framework of the continuum theory of an F-centre the author compares two types of variational functions. It is shown that functions of the first type (hydrogen-like model) give better results in calculation of the ground-state energy. For all the excited states functions of the second type (polaron model) yield more exact values of the energies. This indicates that in the theory of the excited states of an F-centre and other impurity centres in ionic crystals it is necessary to allow for the collective motion of phonons caused by the "excess" electrons (polaron effect). The paper is entirely theoretical. There are 7 references, of which 6 are Soviet and 1 translation from English.

Card
1/1

SUBMITTED: July 8, 1959

37222
S/051/62/012/004/008/015
E059/E485

24.7000

AUTHORS:

Perlin, Yu. Ye., Cheban, A.G.

TITLE:

The capture of polarons by F-centres

PERIODICAL:

Optika i spektroskopiya, v.12, no.4, 1962, 517-518

TEXT:

The results obtained in a previous paper on this subject are made more precise by taking into account the exponential decrease of the effective field $W_F \rightarrow \infty$ acting on the polarons as the translation vector $\xi \rightarrow \infty$. It is shown that this reduces the probability of a transition by an order of magnitude. In particular the effective capture cross-section for polarons in KCl at a temperature of 200°K is $9.5 \times 10^{-16} \text{ cm}^2$ and for NaCl is $9 \times 10^{-15} \text{ cm}^2$. By measuring the photo-conductivity of coloured crystals, values of τ_{int} can be calculated: τ_{int} is the quantum yield by the internal photo-effect of F-centres, μ the mobility and τ the lifetime of the polarons. Using recombination theory, an expression is obtained for the lifetime of the current carriers

(2)

$$\frac{eW_F(\xi_0)}{kT}$$

$$\tau = \tau_{\text{diff}} + \tau_{\text{capt}} e$$

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The capture of polarons ...

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EO39/E485

where τ_{diff} - diffusion time of polarons to F-centres;
 τ_{capt} - lifetime of a carrier with respect to quantum transitions
at discrete levels; $W_F(\)$ - potential at "capture point".

At $\sqrt{\frac{\sigma_F}{\tau}}$, this value is practically equal to zero in the
low temperature region investigated where $\eta = 1$. Values of
 $u\tau$ are tabulated where τ is calculated from Eq.(2) and u from a
formula by Pekar. These values of $u\tau$ show good agreement with
well-known experimental data for crystals of KCl and NaCl.
There is 1 table.

SUBMITTED: May 18, 1961

Card 2/2

PERKIN, J. L. PERLIN, J. L.

Theory of the luminescence of F centers. 12. Two-photon
no.10 3073-3077 C 16.

1. Institut polimerov AN "K. I. Iyev.

PERLIN, Yu.Ye.; CHEBAN, A.G.

The K-absorption band in ionic crystals. Uch.zat.Kish.un.
69:1-2 '64. (MIRA 18:12)

1 12788-66 EWT(1)/T IJP(c) WM/GG

ACC NR: AP5026618

SOURCE CODE: UR/0056/65/049/004/1237/1247

AUTHORS: Gifeyman, Sh. N.; Perlin, Yu. Ye.

ORG: Kishinev State University (Kishinevskiy gosudarstvennyy universitet)

TITLE: Impurity light absorption for arbitrary electron phonon

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 4, 1965, 1237-1247

TOPIC TAGS: electron interaction, light absorption, phonon interaction, impurity center, thermodynamic function, Coulomb interaction, ionic crystal

ABSTRACT: The method of arbitrary coupling, previously developed by one of the authors (Perlin, with I. Ya. Ogurtsov, FTT v. 7, 1467, 1965) for the calculation of thermodynamic functions of the impurity-phonon system, is extended in the present article to include the theory of impurity absorption of light. In this method, the spectral admittance of the system in an external spatially-homogeneous electric field is calculated by continual integration along the trajectories. In the zeroth approximation the system is described by a trial Lagrangian in which both the

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L 12788-65

ACC NR: AP5026618

Coulomb and the electron-phonon interactions are limited by elastic forces. The need for this approach is dictated by the fact that the adiabatic approximation becomes inaccurate when the Bohr frequency of the pure electronic transition and the frequencies of the impurity-active phonons have the same order of magnitude, as is the case for shallow traps of the P-center type in some ionic crystals. The intensity of the no-phonon and one-phonon impurity absorption peaks is derived in first approximation for such traps. The formulas obtained are valid in the case of small heat release and arbitrary electron-phonon coupling. The temperature shift of the impurity absorption lines is also calculated. Orig. art. has: 1 figure, 51 formulas, and 1 table.

SUB CODE: 20/ SUEM DATE: 30Apr65/ NR REF SOV: 009/ OTH REF: 007

HW

Card 2/2

L 23683-66 EWT(1) IJP(c)

ACC NR: AR6005203

SOURCE CODE: UR/0058/65/000/009/D062/D063

AUTHORS: Perlin, Yu. Ye.; Rozenfel'd, Yu. B.

TITLE: On the theory of resonance fluorescence of local centers 34

SOURCE: Ref. zh. Fizika, Abs. 9D492

REF. SOURCE: Uch. zap. Kishinevsk. un-t, no. 75, 1964, 1-11

TOPIC TAGS: fluorescence spectrum, phonon equilibrium, luminescence center, resonance line, excited electron state, line shape, electron transition

TRANSLATION: 2, The authors develop a general theory of impurity resonance luminescence in the case when there is no time for phonon equilibrium to become established in the excited electron state. A modernized Wigner-Weisskopf method is used. Account is taken of the displacements of the equilibrium positions of the phonon coordinates. The change in the elastic constants is disregarded. Formulas are obtained for the probabilities of the resonance fluorescence (RF) and are used to obtain expressions describing the form of the excita- 2

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L 23683-66

ACC NR: AR6005203

tion and RF spectra. The authors consider several particular cases for the latter. If the excitation is by means of a sharp line and there is no phonon dispersion, the RF spectrum constitutes a complicated alternation of maxima, in which a phononless peak is separated. The RF spectrum recalls the Raman spectrum and the process in question is interpreted as Raman scattering, where the light interacts with the phonons via an electron of the local center. The equilibrium luminescence curve is obtained in the case when the exciting light and the pure electron transitions have identical frequencies. If the excitation is by a broad band and there is no phonon dispersion, then the RF spectrum is a 'picket fence' of equidistant lines of natural width. If the excitation is by means of a narrow line and little heat is released, the phononless line in the radiation spectrum duplicates the shape of the lines of the primary light, and in the excitation spectrum it has a natural width. The spectral RF curve near the frequencies of the purely electronic transitions coincides with the form of the curve of the equilibrium luminescence. Bibliography, 7 titles. N. Kristofel'.

SUB CODE: 20

Card

2/2

L 04753-67 EWT(1)/EWT(m)/EWP(e)/EEC(k)-2/T/EWP(k) IJP(c) WG/WH

ACC NR: AP6025949

SOURCE CODE: UR/0051/66/021/001/0013/0018

AUTHOR: Tsukerblat, B. S.; Perlin, Yu. Ye.

ORG: none

TITLE: On theory of multiphonon nonradiating transitions between the local states of dissimilar multiplicity. II. Quantum yield of ruby luminescence on the R-line (low temperatures)

SOURCE: Optika i spektroskopiya, v. 21, no. 1, 1966, 13-18

TOPIC TAGS: electron transition, nonradiative transition, transition probability, transition radiation, ruby laser, ruby optic material, phonon, phonon interaction, crystal lattice energy, crystal lattice parameter, crystal lattice vibration

ABSTRACT: The authors use the adiabatic method to calculate the probability of a multiphonon nonradiation transition ${}^2E_g \rightarrow {}^4A_{2g}$ and the quantum yield of ruby luminescence of the R-line. The interaction with optical and acoustical vibrations of the crystal lattice is taken into account. The investigated transition corresponds to the operating levels of ruby lasers and occurs in the second order of perturbation theory via the virtual state ${}^4T_{2g}$. Other virtual states can be neglected because of their low probability. Taking in account only the strongest interaction of 2E_g and ${}^4A_{2g}$

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UDC: 535.37 : 553.824.01

L 04753-67

ACC NR: AP6025948

electron energy levels with the wholly symmetrical lattice vibrations in the crystal, the adiabatic electron-oscillatory function is given by

$$\Psi(r) = \psi_r(r) \prod_k \phi_{N_k}(q_k - q_k^0) \prod_{\alpha, \sigma} \phi_{n_{\alpha\sigma}}(q_{\alpha\sigma} - q_{\alpha\sigma}^0),$$

where $\psi_r(r)$ is the electron wave function from the crystal field theory; ϕ_n are wave functions of the harmonic oscillators; indices k, s identify wave vectors and zones of the acoustical phonons; α, σ are correspondingly related to the photons. The values

$$q_{\alpha\sigma}^0 (\alpha = k, \alpha, \sigma = s, \sigma)$$

represent the displacements of the equilibrium for the oscillators in the phonon field due to electron-phonon interactions. The authors proceed from the standard expression for the probability of multiphonon nonradiation transitions, derived by the authors in an earlier work, to develop an expression which accounts for both the phonon and photon interactions in the crystal. Based on this expression the probability of nonradiation transition ${}^2E_g \rightarrow {}^4A_{2g}$ at low temperatures has a value of 1.4 sec^{-1} .

Considering the lifetime of the E_g state to be $4.3 \cdot 10^{-3} \text{ sec}$ the quantum yield, in agreement with the experimental data, is practically equal to unity. Orig. art. has: 25 formulas.

SUB CODE: 20/

SUBM DATE: 14Dec64/

ORIG REF: 004/

OTH REF: 002

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ACC NR: AP6036979

(A, N)

SOURCE CODE: UR/0181/66/008/011/3324/3334

AUTHOR: Perlin, Yu. Ye.; Gifeysman, Sh. N.

ORG: Kishinev State University (Kishinevskiy gosudarstvennyy universitet)

TITLE: Diamagnetism of bound polarons

SOURCE: Fizika tverdogo tela, v. 8, no. 11, 1966, 3324-3334

TOPIC TAGS: polaron, diamagnetism, impurity center, ionic crystal, electron spin, magnetic susceptibility, ionization

ABSTRACT: This is a continuation of earlier work (FTT v. 7, 1467, 1965 and elsewhere) dealing with hydrogenlike local centers in ionic crystals. The present article extends the earlier results to include the case of a weak homogeneous external magnetic field and the case of a bound polaron. Inasmuch as the Lagrangian formalism of quantum mechanics has been developed only for systems having a classical Lagrangian, the present investigation is limited to diamagnetic effects of the localized electron which are not coupled to the spin. The partition function of an impurity semiconductor in a magnetic field is represented in the form of a Feynman functional integral over the trajectories of the localized electron. In the zeroth approximation, the system is described by a trial Lagrangian in which the Coulomb terms are imitated by elastic interactions. The dependence of the trial-Lagrangian parameters on the magnetic field is disregarded. In the first approximation in the difference between the true and trial action the authors calculate the free-energy correction which is

Cord 1/2

ACC NR: AP6036979

quadratic in the magnetic field intensity. Formulas for the diamagnetic susceptibility of the local centers is the function of the crystal parameters and the temperature are obtained for the limiting cases of strong and weak local coupling. In both limiting cases, allowance for the polaron effect leads to a decrease in the diamagnetic susceptibility compared with the hydrogenlike susceptibility by a factor 1.5 - 2 times. A formula is also obtained for the dependence of the ionization energy of the local center on the magnetic field intensity. Orig. art. has: 43 formulas and 1 table.

SUB CODE: 20/ SUBM DATE: 07Apr66/ ORIG REF: 008/ OTH REF: 013

Card 2/2

ACC NR: AR7000872

SOURCE CODE: UR/0058/66/000/009/E074/E074

AUTHOR: Perlin, Yu. Ye.; Kharchenko, L. S.

TITLE: Quantum yield of the thermo-optical ionization of local centers

SOURCE: Ref. zh. Fizika, Abs. 9E605

REF SOURCE: Uch. zap. Kishinevsk. un-t, v. 80, 1965, 51-56

TOPIC TAGS: quantum yield, thermal optic effect, ionization, phonon equilibrium, electron

ABSTRACT: The quantum yield (η) of thermo-optical ionization of electrons from deep local levels into the conduction band was calculated, on the assumption that the non-radiative transfer of electrons from excited local levels to the conduction band occurs faster than the return of the phonon subsystem to a state of equilibrium (nonequilibrium thermo-optical process). It is shown that with sufficiently high Stokes losses, when radiative transfers from the nonequilibrium intermediate state to the basic state can be neglected, the probability of nonequilibrium thermo-optical transfer is greater than the probability of an equilibrium transfer. In

Cord 1/2

ACC NR: AR7000872

this process the dependence of quantum yield on temperature is basically described by the $\exp(-\Delta E/kT)$, where the activation energy of ΔE is mainly a function of light frequency. A calculation was made for a case of a simple zone, and a local center is examined in an adiabatic approximation. The method of configurational curves is used to determine the electron-phonon relationship. V. Tulvinskiy. [Translation of abstract] [GC]

SUB CODE: 20/

Cord 2/2

ACC NR: AP/005333

SOURCE CODE: UR/0131/66/007011/000300

AUTHOR: Berlin, Yu. Ye.; Rozenfel'd, Yu. B.; Tsukerblat, B. S.

ORG: Kishinev State University (Kishinevskiy gosudarstvennyy universitet)

TITLE: On the nature of the optical impurity absorption bands and luminescence of crystals activated with rare-earth ions

SOURCE: Fizika tverdogo tela, v. 3, no. 12, 1966, 3490-3499

TOPIC TAGS: activated crystal, luminescence, absorption band, light absorption, impurity center, Stark effect, phonon interaction, electron interaction

ABSTRACT: In view of the fact that the classical theory of the crystalline field, which takes into account the Stark splitting of the levels of the impurity ion by the quenched lattice, is insufficient for the interpretation of the spectra of impurity absorption and luminescence of trivalent ions of rare-earth elements (Tr^{3+}) in crystals of the MeF_2 type, the authors employ the theory of impurity light absorption and luminescence in crystals, developed by M. A. Krivoglaz and S. I. Pekar (Trudy, Physics Institute, AN UkrSSR, v. 4, 37, 1953), to explain the influence of electron-phonon interaction on the shape of the impurity absorption or luminescence spectra in the $MeF_2:Ce^{3+}$ spectrum. The concrete examples considered are the $4f \rightarrow 5d$ transitions in the crystals CaF_2 , BeF_2 , and SrF_2 activated with Ce^{3+} . The interaction between the outer electrons of a small-radius local center with optical and acoustical vibrations of the crystal is taken into account in the adiabatic approximation. It is shown that

Cord 1/2

ACC NR: AP7005833

the presence of local oscillations can lead, under certain conditions, to a periodic distribution of intensity in the optical spectrum. The parameters of the optical bands are calculated and a level scheme for the Ce^{3+} in the cubic crystalline field is presented. The theoretical calculations are compared with the experimental data of A. A. Kaplyanskiy et al. (Opt. i spektr. v. 14, 664, 1963) and reasons for some discrepancies are indicated. The authors thank S. I. Pekar, A. A. Kaplyanskiy, and B. Z. Malkin for useful discussion. Orig. art. has: 1 figure, 30 formulas, and 1 table.

SUB CODE: 20/ SUBM DATE: 25Mar66/ ORIG REF: 011/ OTH REF: 004

Card 2/2

L 26765-66 EWT(1)/EWT(m)/T IJP(c) JD/JG/GG

ACC NR: AT6005613

UR/2837/64/069/000/0001/0002

66
B+/

AUTHOR: Perlin, Yu. Ye.; Cheban, A.G.

ORG: Kishinev State University, Kishinev (Kishinevskiy Gosuniversitet)

TITLE: On the problem of K-band absorption in ionic crystals

SOURCE: Kishinev, Universitet, Uchenyye zapiski, v. 69, 1964, 1-2

TOPIC TAGS: crystal, ionic crystal, alkali halide, crystal absorption, absorption band, polaron, ionization, K band, L band

ABSTRACT: Previous work of the authors and others is reviewed to establish the theory that the K-absorption band can be related to photo-transitions of electrons in crystals from the ground F-center state into a polaron state. Certain computed and experimentally determined parameters (location of maxima of η , and halfwidths) of the F-photoionization curves involving creation of polarons and K-bands are tabulated for the ionic alkali-halide crystals: NaCl, KCl, KBr, KI, RbCl, RbBr, RbI. Good correspondence of the experimentally determined with the computed data is considered as supporting the hypothesis of phototransition into ionized polaron states as the origin of the K-band in alkali halide crystals. Interpretation of the L-bands requires additional energy zone data evaluation for the alkali halide crystals. Orig. art. has: 1 table.

SUB CODE: 20/

SUBM DATE: None/

ORIG REF: 003

OTH REF: 003

Card 1/1

L 31493-66 ENT(1)/T IJP(c)

ACC NR: AP6013022

SOURCE CODE: UR/0051/66/020/004/0657/0660

AUTHOR: Perlin, Yu. Ye.; Kovarskiy, V. A.; Tsukerblat, B. S.

50

ORG: none

8

TITLE: Contribution to the theory of many-phonon nonradiative transitions between local states of different multiplicity. I.

SOURCE: Optika i spektroskopiya, v. 20, no. 4, 1966, 657-660

TOPIC TAGS: nonradiative transition, spin orbit interaction, phonon interaction, electron interaction, *SPIN SYSTEM*

ABSTRACT: The authors analyze many-phonon nonradiative transitions between levels of different multiplicity within the framework of the adiabatic approximation. The electron-phonon interaction is assumed to be small compared with the spin-orbit interaction, and the non-adiabaticity operator is treated as the perturbation, using a method described by the authors elsewhere (Fiz. v. 4, 1936, 1962; Usp. fiz. nauk v. 80, 553, 1963). Possible mechanisms of many-phonon transitions are discussed, and a general formula is obtained for the probability of nonradiative transition with spin flip due to the spin-orbit interaction. The upper limiting case, when the spin-orbit interaction is small compared with the electron-

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UDC: 535.330: 548.0

L 31493-66

ACC NR: AP6013022

phonon interaction is considered in detail. The matrix element for the spin-orbit interaction is then regarded as the perturbation. Different expressions for the nonradiative transition are then obtained, depending on whether the electronic part of the matrix element of this transition vanishes or not. Orig. art. has: 17 formulas.

SUB CODE: 20/ SUBM DATE: 14Dec64/ ORIG REF: 004/ OTH REF: 002

Card 2/2 mc

PERLIN, Yu.Ye.; ROZENFEL'D, Yu.B.

Theory of resonance fluorescence of local centers. Uch.
zap. Kish. un. 75:1-11 '64. (MIRA 18:10)

L 5412-66 EWA(h)/FED/ENT(1)/EMP(e)/ENT(m)/EEC(k)-2/EMP(1)/T/EMP(k)/EWA(m)-2/EWA(h)
 ACC NR: AP5027405 SCTB/IJP(c) WG/WH SOURCE CODE: UR/0181/65/007/011/3278/3288

AUTHOR: Tsukerblat, B. S.; Perlin, Yu. Ye. 44 55 68 64 B

ORG: Kishinev State University (Kishinevskiy gosudrastvennyy universitet)

TITLE: On the theory of nonradiative transitions involving several phonons in localized paramagnetic centers 44.55 21.44.65

SOURCE: Fizika tverdogo tela, v. 7, no. 11, 1965, 3278-3288

TOPIC TAGS: phonon interaction, nonradiative transition, ruby laser 15 25.44

ABSTRACT: The authors calculate the probability of nonradiative multiphonon transitions between the orbital triplets ${}^2T_{2g}$ and ${}^2T_{1g}$ in the Cr^{3+} ion (as well as in other ions with d^3 configuration) in an octahedral crystal field. This transition is the "bottleneck" in the relaxation process for population inversion in the working levels of a ruby laser (the single-quantum ${}^2T_{1g} \rightarrow {}^2E_g$ transition takes place at a much faster rate). States of various multiplicity are considered. The spin-orbital interaction of the Cr^{3+} ion is small in comparison with the effective crystal field and may be treated as a perturbation which causes the multiphonon transition.

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L 5412-66

ACC NR: AP5027405

4

tion. The formula for the transition is derived in the adiabatic approximation, taking the Jahn-Teller effect into account. Since the introduction of a chromium ion in place of aluminum in the corundum lattice (Al_2O_3) does not generate quasi-molecular (localized) vibrations, a small number of variables will not suffice to describe the electron-vibration system. The final results are considerably dependent on the parameters of the crystal. The greatest contribution to the probability of the transition is from processes with simultaneous participation of longitudinal and transverse acoustic phonons. The authors thank I. E. Bersuker and E. G. Vekhter for useful consultation. (orig. art. has: 40 formulas, 1 table.)

SUB CODE: SS/

SUBM DATE: 28Mar/65/

ORIG REF: 007/

OTH REF: 011

BYK

Card 2/2

L 00767-66 EWT(1)/T IJP(c) GG

ACCESSION NR: AP5012559

UR/0181/65/007/005/1467/1474

AUTHOR: ^{44.55}Perlin, Yu. Ye.; ^{44.55}Ogurtsov, I. Ya.

TITLE: Vibrational method in the thermodynamics of impurity-phonon systems ⁵²₄₉ B

SOURCE: Fizika tverdogo tela, v. 7, no. 5, 1965, 1467-1474

TOPIC TAGS: partition function, crystal impurity, variational method, ionic crystal, F center, electron interaction, phonon interaction ^{21.44.55}

ABSTRACT: An expression is derived for the partition function of an impurity crystal, in the form of a continual integral over the trajectories of the localized electron. The approach is based on a procedure first employed by R. P. Feynman (Phys. Rev. v. 97, 660, 1955), consisting of replacing the exact Hamiltonian of the system by a trial Hamiltonian containing variational parameters. In this article, a trial action is introduced, which makes it possible to reduce the calculation of the thermodynamic functions of an ionic crystal with an F-center to the problem of finding the maximum of a function of three parameters. The problem is solved in the limiting case of strong coupling between the localized electron and the lattice defect, for an arbitrary electron-phonon coupling. Formulas are obtained for the internal energy of the system, for the energy of the ground state, and for the impurity specific heat. The results are compared with those obtained by a different

Card 1/2

L 00767-66

ACCESSION NR: AP5012559

approach, which are claimed to be somewhat less accurate. Orig. art. has: 30 formulas and 1 table. 44.55

ASSOCIATION: Kishinevskiy gosudarstvennyy universitet (Kishinev State University)

SUBMITTED: 08Dec64

ENCL: 00

SUB CODE: SS, GP

NR REF SOV: 006

OTHER: 005

Card 2/2 DP

1.16234-65
ACCESSION NR: EWT(1)/T/EEQ(b)-2 IJP(c)/ESD(gs)/ASD(a)-5/AS(mp)-2
AP4045726 0/0030/64/006/003/0615/0625

AUTHOR: Pekar, S. I.; Perlin, Yu. Ye.

TITLE: Local electron centers in ionic crystals 21

SOURCE: Physica status solidi, v. 6, no. 3, 1964, 615-625

TOPIC TAGS: F center, energy level, 2s state, 2p state, F luminescence, local electron center, emission probability, absorption probability

ABSTRACT: This paper analyzes the statements by W. Beall Fowler and D. L. Dexter (Phys. stat. sol. 2, 821, 1962; 3, 1855, 1962) about the F-center theory. It is shown that, in spite of Stokes shift and difference in the Frank-Condon matrix elements of absorption and emission transitions, Einstein's relation for expressing the emission probability in terms of light absorption probability can be employed without limitations or approximations. Formulas are derived for the integral intensity of impurity absorption and emission. The good agreement between theoretical and experimental results, even in the case of alkali-halide crystals, when the electron orbit radius r does not exceed the lattice constant a ($r \leq a$), is explained. Formulas which do not depend on the ψ -function of the electrons and are

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L 16284-55

ACCESSION NR: AP4045726

common to all local centers of any nature are derived without the use of the effective mass method, calculation of polarization, or a concrete F-center model. Formulas of the continuous F-center theory for absorption and luminescence are compared with those based on experimental data. However, owing to the strong dependence, the formulas show considerable errors (by a factor of 2 to 3) for alkali-halide crystals. The assumption made by Fowler and Dexter that F-luminescence in KCl arises from a double level is discussed in detail. It is shown that in the continuous F-center theory the energy level of the self-consistent 2n state is higher than that of the 2p state. Orig. art. has: 20 formulas.

ASSOCIATION: Institut poluprovodnikov Akademii nauk UkrSSR, Kiev (Institute of Semiconductors, Academy of Sciences, UkrSSR); Kishinevskiy gosudarstvennyy universitet (Kishinev State University)

SUBMITTED: 27Apr64

NO REF NOV: 011

INCL: 00

SUB CODE: SS

OTHER: 013

Card 2/2

L 16175-62 EWT(1)/EEC(b)-2 ASD(n)-5/AS(mp)-2/AFWL/ESD(ga)/ESD(t)/IJP(c)

ACCESSION NR: AP4046622

S/0181/64/006/010/3073/3077

AUTHORS: Pekar, S. I.; Perlin, Ya. Ye.

TITLE: Contribution to the theory of F-center luminescence *A* *B*

SOURCE: Fizika tverdogo tela, v. 6, no. 10, 1964, 3073-3077

TOPIC TERMS: luminescence, luminescence polarization, wave function, phototransition, adiabatic approximation

ABSTRACT: The authors get around some of the mathematical difficulties involved in the adiabatic approximation by using an approach which is only approximately adiabatic, wherein the state of the electron and the corresponding energy are assumed to be slow functions of the normal coordinates, but these functions are expanded in powers of the deviation from the normal positions of the equilibrium positions of the normal coordinates. An electron radiative $2p \rightarrow 1s$ phototransition in an F center is considered, with account

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L 16175-65

ACCESSION NR: AP4046622

of the interaction between the electron and the polarization vibrations of the lattice and of the changes in the equilibrium positions of the ions during the phototransition. The radii of the electron states are assumed to be sufficiently large, and the polarization of the crystal by the electron is calculated continually. For the nuclear configuration corresponding to the initial (2p) state of the electron, the authors calculate the energy levels and the wave functions $\psi_{1s}^{2p}(r)$ and $\psi_{2p}^{2p}(r)$ of the 2p and 1s states, and also the

Frank-Condon matrix element of the radiative phototransition between them. Specific calculations for the KCl crystal show that the Frank-Condon matrix element of the coordinate for the radiative transition can be 1.5--2 times larger than for the absorptive transition. This result is just the opposite of what was obtained by Beall Fowler and Dexter (Phys. Rev. v. 128, 2154, 1962). Orig. art. has: 17 formulas and 1 table.

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2/3

L 16175-65 //

ACCESSION NR: AP4046622

ASSOCIATION: Institut poluprovodnikov AN UkrSSR, Kiev (Institute
of Semiconductors AN UkrSSR)

SUBMITTED: 28Apr68

ENCL: 00

SUB CODE: SB, OP

NR REF SOV: 007

OTHER: 004

Cord 3/3

PERLIN, YU. YE.

Yu. Ye. Perlin, "Theory of the Impurity Centers."

report submitted for the Conference on Solid State Theory, held in Moscow,
December 2-12, 1963, sponsored by the Soviet Academy of Sciences.

PERLIN, Yu.Ye.

Modern methods in the theory of multiphonon processes. Usp. fiz.
nauk 80 no.4:553-595 Ag '63. (MIRA 16:9)

PERLIN, Yu.Ye.; CHEBAN, A.G.

On the theory of field ionization of local states.
Fiz. tver. tela 4 no.11:3220-3227 N '62. (MIRA 15:12)

1. Kishinevskiy gosudarstvennyy universitet.
(Quantum theory) (Ionization)

L 10067-6; EWT(1)/BDS/EEC(b)-2--AFFTC/ASD/ESD-3--IJP(C)
 ACCESSION IR: AR3000371 S/0058/63/000/004/E060/E060

SOURCE: RZh. Fizika, Abs. 4E404

58

AUTHOR: Perlin, Yu. Ye; Cheban, A. G.

TITLE: On the theory of the decay of excited color centers²⁾ in an electric field.

CITED SOURCE: Tr. po fiz. poluprovodnikov. Kishinevsk. un-t, vyp. 1, 1962, 3-14

TOPIC TAGS: color center decay, conductivity of semiconductors

TRANSLATION: The probability of disintegration of an excited F-center by an external electric field is calculated. It is assumed that the intensity of this field E is much smaller than critical, at which the polarons disintegrate. The calculation is made within the framework of the continual model of the F-center in the adiabatic approximation. Use is made of the fact that in the zero approximation the excited state of the F-center can be interpreted as the motion of an undeformed polaron in a Coulomb field which is distorted at small distances.

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L 10067-63

ACCESSION NR: AR3000371

0

The quadratic Stark shift is disregarded. The solution of the equation for the polaron is sought by a variational method. A critical distance $R_{sub 0}$ is introduced in such a way, that when the distance R of the polaron to the center is smaller than $R_{sub 0}$ it is possible to neglect its interaction with the external field, while when R is greater than $R_{sub 0}$ it is possible to neglect the difference between the potential energy of the polaron and its Coulomb energy, and the solutions for these two regions join together at $R_{sub 0}$. Calculation of the tunnel current through the barrier is carried out in the quasi-classical approximation. At absolute zero the quantum yield of the photo effect for KCl is practically equal to zero up to E equals 2.6×10^6 v/cm. Extrapolation to larger fields shows that in the narrow field interval from 2.6×10^6 to 2.8×10^6 v/cm the quantum yield increases to unity. The experimental curve is similar in shape to the theoretical curve, but the quantum yield approaches unity even at E equals $300,000$ v/cm. The reason for the discrepancy may be related both with the errors in the calculation and the inhomogeneity of the external field, as well as with the sufficiently low temperature at which the experiments are performed. E. Nagayev

DATE ACQ: 14 May 63 ENCL: 00 SUB CODE: PH

lm/nh
Cord 2/2

PEKAR, S.I.; PERLIN, Yu.Ye.

Lifetime of excited F-centers. Zhur. eksp. i teor. fiz. 4⁵ no.3:
1108-1110 '62. (MIRA 15:10)

1. Institut poluprovodnikov AN UkrSSSR.
(Ionic crystals) (Quantum theory)

PERLIN, Yu.Ye.; CHEBAN, A.G.; TSUKERBLAT, B.S.

Theory of the capture and scattering of polarons by F-centers.
(MIRA 15:7)
Uch. zap. Kish. un. 49:11-18 '61.
(Electrons--Scattering) (Electrons--Capture) (Quantum theory)

43124
9/181/62/004/011/024/049
B125/B186

AUTHORS: Perlin, Yu. Ye., and Cheban, A. G.

TITLE: On the theory of autoionization of local states

PERIODICAL: Fizika tverdogo tela, v. 4, no. 11, 1962, 3220-3227

TEXT: The quasi-classical method of calculating the tunnel decay of a hydrogen-like atom (L. D. Landau and Ye. M. Lifshits. Kvantovaya mekhanika (Quantum mechanics), GITTL 1948) in a strong electromagnetic field is generalized to the case where the electron is localized in a Coulomb field distorted at small distances from the center. A polaron at rest and an excited F-center are taken as examples. When calculating the self-consistent state of a Pekar polaron (S. I. Pekar. Issledovaniya po elektronnoy teorii kristallov (Investigations on the electron theory of crystals), GITTL 1951) in a strong electric field it is necessary to consider the deformation of the self-consistent field besides the direct interaction between the electron and the external field. If $E \ll E_{crit}$ (for crystals of the alkali-halide type $E_{crit} \sim 3 \cdot 10^6$ v/cm), the deformation of the self-consistent field can be neglected. By this approximation the ionization

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On the theory of autoionization...

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B125/B186

probability

$$w_{\text{ion}} = a_0^3 \left(\frac{4}{\delta n^2} \right)^{2n_2} f(\eta_0) \exp \left(-\frac{2}{3\delta n^2} \right), \quad (1.25),$$

$$f(\eta_0) = \eta_0^{-2n_2} \exp \left[\eta_0 \left(\frac{1}{n} - a_0 \right) \right]. \quad (1.26)$$

can be derived from the electron wave function and the energy of the self-consistent state of the polaron at rest at $\epsilon = 0$, using the expression

$\psi(r) = \psi_1(\xi) \psi_2(\xi)$ for the axially symmetrical solution. Thereby

$a_0 = (5/16) \pi e^2 c / \hbar^2$, $n = (-2E)^{-1/2}$, $n_2 = n\beta_2 - 1/2$, β_2 is one of the two constants for separation of variables. For η_0 of the parabolic coordinate $\eta = r - z$, the inequality $1 \leq \eta_0 \leq 2|E|/\mathcal{E}$ is valid. Thus, for KCl crystals the autoionization probabilities, given in sec^{-1} , were 4.5 , 7.1 , $3 \cdot 10^5$, $2.7 \cdot 10^7$, $2.2 \cdot 10^5$. These values correspond to $\mathcal{E} = (0.6, 0.7, 0.8, 0.9, \text{ and } 9.1) \cdot 10^6$ v/cm. The critical field strength is apparently $\mathcal{E} \sim 8 \cdot 10^5$ v/cm. The autoionization probability for an excited F-center with a transition of a localized electron from the potential well into the free state is derived
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On the theory of autoionization...

S/181/62/004/011/024/049
B125/B186

similarly by solving the wave equation for the electron wave function ψ_2 in the presence of an external homogeneous field. For ψ_2 an exponential expression with parabolic coordinates is used. The autoionization probabilities for an excited F-center were $6.2 \cdot 10^4$; $9.5 \cdot 10^5$; $5.0 \cdot 10^6$; $1.7 \cdot 10^7 \text{ sec}^{-1}$ and $4.9 \cdot 10^9$ for the \mathcal{L} -values (2.2; 2.3; 2.4; 2.5; and $3.0 \cdot 10^6 \text{ v/cm}$). The autoionization is considered to be the only possible reason for the decay of excited F-centers near absolute zero. There are 2 figures and 2 tables.

ASSOCIATION: Kishinevskiy gosudarstvennyy universitet (Kishinev State University)

SUBMITTED: June 25, 1962

Card 3/3

PERLIN, Yu.Ye.; CHEBAN, A.G.

Polaron capture by F-centers. Opt. i spektr. 7 no.4:517-518
Ap '62. (MIRA 15:5)
(Color centers) (Quantum theory)

S/056/62/043/003/055/063
B104/B102

14,3500

AUTHORS: Pekar, S. I., Perlin, Yu. Ye.

TITLE: The lifetime of excited F centers

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 1, no. 9(9), 1962, 1108-1110

TEXT: Calculated and experimental results for the radiation lifetimes of excited F centers are shown to be in good agreement, the former being based on the continuous theory of F centers of ionic crystals established by S. I. Pekar (Issledovaniya po elektronnoy teorii kristallov - Research into the electron theory of crystals, Gostekhizdat, 1951; ZhETF, 22, 241, 1952) and the latter obtained by R. K. Swank and F. C. Brown (Phys. Rev. Lett., 8, 10, 1962). The formula

$$\tau_R^{-1} = 4e^2 n \Omega_m^3 z_{21}^2 / 3 \hbar c^3$$

is deduced for the radiation lifetime. Ω_m is the maximum frequency in the luminescence band, n is the refractive index. Results:

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The lifetime of excited F centers

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B104/B102

	KCl	KBr	KI
$10^6 \tau_R$ (experimental), sec	0.59	1.1	2.1
$10^6 \tau_R$ (calculated), sec	0.59	0.59	0.64

Thus theory justifies making not only qualitative but also quantitative statements as to the infrared luminescence bands and radiation lifetime of the F centers.

ASSOCIATION: Institut poluprovodnikov Akademii nauk USSR (Institute of Semiconductors of the Academy of Sciences UkrSSR)

SUBMITTED: June 16, 1962

Card 2/2

PERLINA, A. M.

"Water Softening in a City Water-Supply System." Sub 3 Jun 47,
Moscow Inst of Engineers of Municipal Construction

Dissertations presented for degrees in science and engineering in
Moscow in 1947.

SO: Sum.No. 457, 18 Apr 55

Land. Tech. Sec.

PERLINA, A. M.

Voshchenko, Z. S. and Perlina, A. M. "Soft waters in municipal economy and living conditions," San. Tekhnika, Issue, 2, 1948, p. 19-44

SO: U-2888, Letopis Zmurnal'nykh Statey, No.1 , 1949

PERLINA, A.M.

POPOV, I.P., kandidat biologicheskikh nauk; PERLINA, A.M., kandidat
tekhnicheskikh nauk; KASHAYEV, S.I.

Water softening in Moscow laundries. Gor.khoz.Mosk. 28 no.8:22-23
Ag '54. (MLRA 7:9)

1. Starshiy tekhnolog Moskovskogo gorodskogo tresta prachechnykh
(for Kashayev)
(Water--Softening) (Moscow--Laundries, Public) (Laundries,
Public --Moscow)

PERLINA, A.M.

BLIOKH, S.S., kandidat meditsinskikh nauk; PERLINA, A.M., kandidat tekhnicheskikh nauk; KOZLOVA, N.L., inzhener

Effectiveness of the new method of purifying drinking water (contract clarification). Gig. i san. 22 no.1:70-72 Ja '57. (MLRA 10:2)

1. Iz Nauchno-issledovatel'skogo sanitarnogo instituta imeni Erismana, Akademii kommunal'nogo khozyaystva imeni Pamfilova i laboratorii Rublevskoy vodoprovodnoy stantsii.

(WATER SUPPLY,

purification, contact clearing technic (Rus))

Perlina A.M.

USSR /Chemical Technology. Chemical Products
and Their Application
Water treatment. Sewage water.

H-5

Abs Jour: Referat Zhur - Khimiya, No 1, 1958, 1697

Author : Perlina A.M.

Title : Experience with the Use of Contact Clarifiers

Orig Pub: Sb.: Issledovaniya po vodopodgotovke. M., Gos.
izd-vo po str-vu i arkhitekt., 1956, 86-89

Abstract: Results of tests of industrial contact clarifiers (CC) at a number of water supply stations. All the CC produce a lowering of the color and turbidity of the water to meet the GOST. In bacteriological and hydrobiological indices the water is practically identical with water purified in conventional units. As concerns the zooplankton a somewhat inferior purification result has been

Card 1/2

USSR /Chemical Technology. Chemical Products
and Their Application
Water treatment. Sewage water.

Abs Jour: Referat Zhur - Khimiya, No 1, 1958, 1697

attained. Coagulating agent dosages amount to 20-55% of those used at conventional installations. With a turbidity of the initial water not above 4-5 mg/liter and a coloration not in excess of 28-30°, the CC can operate without coagulation. Minimum duration of operation cycle of CC is greater than the permissible limit in the case of rapid filters. The average yearly consumption of wash water is 3.5-9%; the maximal (during floods) is 10-18%. To control the horizontal shifting of gravel layers it is recommended to use distributing systems having a large resistance without horizontal compensation.

Card 2/2

PERLIN
PISKUNOV, Pavel Ivanovich, prof., doktor tekhn.nauk; NAGORNOV, Nikolay
Ivanovich; PERLINA, A.M., red.; SHVEDOV, Yu.F., red.izd-va;
KONYASHINA, A.D., tekhn.red.

[Operation of clarifiers with suspended filters] Praktika
ekspluatatsii osvetlitelei so vzveshennym fil'trom. Moskva,
Izd-vo M-va kommun.khoz.RSFSR, 1957. 48 p. (MIRA 11:1)

1. Glavnyy inzhener Gor'kovskogo vodoprovoda.
(Water--Purification)

PERLINA, A.M.; BALASHOVA, G.V.; GORYAINOVA, G.S.

Removing iron from ground water by means of filters. Nauch. trudy
AKKH no.22:3-18 '63. (MIRA 18:5)

Perlina, A.M.

SHUBERT, S.A.; PERLINA, A.M.; KULZHINSKIY, V.I.; SIDENKO, T.K.; ALEKSANDROV, D.N.; SOKOLOV, V.P.; PAL'KOVSKAYA, L.N.; BRUK-LEVINSOY, T.L.; BELYAKOVA, A.N.; KOZHEVNIKOVA, Ye.K.; AVRUSHCHENKO, E.A., red. izd-va; VOLKOV, S.V., tekhn.red.

[Water purification for water supply to machine-tractor stations and state farms] Ochistka vody dlia vodosnabzheniia poselkov MTS i sovkhov. Moskva, Izd-vo M-va kommun.khoz. RSFSR, 1957. 69 p. (MIRA 11:6)

1. Akademiya kommunal'nogo khozyaystva, Moscow.
(Water--Purification) (Water supply, Rural)

PAKHLINA, F.K., kandidat meditsinskih nauk

Metastatic cerebral abscesses in children. *Pediatrics* no.3:74-77
Mr '57. (MIRA 10-10)

1. Iz 1-y gorodskoy infektsionnoy bol'nitsy Dnepropetrovska
(glavnyy vrach F.K.Hyushko) i Detskoy klinicheskoy bol'nitsy
(glavnyy vrach L.V.Volkova)
(BRAIN--ABSCESS)

PERLINA, F.I., kandidat meditsinskikh nauk

Clinical peculiarities of acute poliomyelitis in adults. Sov.med.
21 no.5:81-84 My '57. (MIRA 10:7)

1. Iz kliniki infektsionnykh bolezney (zav. - prof. I.I.Levin)
Dnepropetrovskogo meditsinskogo instituta i 1-y gorodskoy infektsion-
noy bol'nitsy (glavnyy vrach - F.K.Nyushko)
(POLIOMYELITIS
in adults, clin. aspects)

PERLINA, F.I., kand.med.nauk

Clinical aspects and diagnosis of aparalytic and abortive forms of
poliomyelitis. Sov.med. 21 no.12:41-46 D '57. (MIRA 11:3)

1. Iz kafedry infektsionnykh bolezney (zav.-prof. I.I.Levin)
Dnepropetrovskogo meditsinskogo instituta i Pervoy gorodskoy
infektsionnoy bol'nitsy (glavnyy vrach F.K.Nyushko)

(POLIOMYELITIS

aparalytic & mild forms, diag. & clin. manifest. (Rus)

PERLINA, P. I.

Affections of the nervous system in antirabies vaccination. Zhurn.
mikrobiol. epid. i immu. 28 no. 7 37-41 J1 '57. (MIRA 10:10)

1. Iz Dnepropetrovskogo meditsinskogo instituta, Pervoy gorodskoy
infektsionnoy bol'nitsy i Detskoj klinicheskoy bol'nitsy.

(NEUROUS SYSTEM, diseases,

caused by rabies vaccine (Rus))

(RABIES, immunology,

vacc. causing no dis. (Rus))

PERLINA, Y. I.

Etiology and clinical aspects of brain abscesses. *Nov. khir. arkh.*
no. 2:107-108 ~~Mr~~-Ap '58 (MIRA 11:6)

1. Dnepropetrovskaya gorodskaya infektsionnaya bol'nitsa.
(BRAIN--ABSCESS)

LEVIN, I.I., prof. [deceased], PERLINA, F.I. kand.med.nauk

Acute rheumatic meningitis. Vrach.delo no.6:573-577 Jo '58

(MIRA 11:7)

1. Klinika infektsionnykh bolezney (sav.- prof. I.I. Levin [deceased])
Inepetrovskogo meditsinskogo instituta i Pervaya gorodskaya infek-
tsionnaya bol'nitsa.

(MENINGITIS)

(RHEUMATIC FEVER)

PERLINA, F.I., kand. meditsinskikh nauk

Clinical syndromes of diseases of the nervous system in influenza.
Scv. med. 24 no.4:82-89 Ap '60. (MIRA 13:8)

1. Iz Pervoy dnepropetrovskoy gorodskoy infektsionnoy bol'nitsy
(glavnyy vrach F.K. Nyushko).
(NERVOUS SYSTEM--DISEASES)

PERLINA, F.I.

Role of the posterior radicles of the spinal cord in the regulation of trophic functions; osteoarthropathy and changes in the gastrointestinal tract in tabes dorsalis. Zhur. nevr. i psikh. 60 no.10: 1281-1290 '60. (MIRA 14:1)

1. Dnepropetrovskiy oblastnoy kozhno-venerologicheskoy dispensar (glavnyy vrach M.I. Prokhorovko).

(LOCOMOTOR ATAXIA)
(BONES—DISEASES)

(DIGESTIVE ORGANS)
(JOINTS—DISEASES)

EXCERPTA MEDICA Sec 4 Vol 12/1 Med. Micro. Jan 59

351. AFFECTION OF THE NERVOUS SYSTEM IN ANTIRABIC VACCINATION
(Russian text) - Perlina F. I. - ZH. MIKROBIOL. EPID. I IMMUNOBIOL.
1957, 7:37-41)

Twelve cases of nervous system damage after vaccination against rabies were observed. The disease appeared 7 days-2 months after vaccination. Some patients had no contact with diseased animals. Clinical picture: meningoradiculomyelitis 6 patients, meningoradiculomyeloencephalitis 5 patients, radiculitis one patient. The feverish state lasted in 8 patients for 1-2 weeks, in 2 more than 3 weeks; 2 patients had no fever. The decrease of temperature was lytic. All patients recovered. Why only some individuals fall ill out of a great number of inoculated persons is not yet clarified.

Tarabek - Kojice (IV, 17)

PERLINA F.I.
EXCERPTA MEDICA Sec 17 Vol 5/5 Public Health May 59

1342. AFFECTION OF THE NERVOUS SYSTEM IN ANTI-RABIC VACCINATION
(Russian text) - Perlina F.I. - ZH. MIKROB. EPID. I IMMUNOBIOI.
1957. 7 (37-41)

Twelve cases of nervous system damage after vaccination against rabies were observed. The disease appeared 7 days-2 months after vaccination. Some patients had no contact with diseased animals. Clinical picture: meningoradiculomyelitis - 6 patients, meningoradiculomyeloencephalitis - 5 patients, radiculitis - 1 patient. The feverish state lasted in 8 patients 1-2 weeks, in 2 more than 3 weeks, 2 patients had no fever. The decrease of temperature was lytic. All patients recovered. Why only some individuals fall ill out of a great number of inoculated persons is not yet clarified.

Tarabčák - Košice (IV, 17)

PERLINA, E.I., kand.med.nauk (Dnepropetrovsk)

Acute paralysis of the facial nerve and poliomyelitis. Klin.med.
36 no.9:119-124 S'58 (MIRA 11:10)

1. Iz kliniki infektsionnykh bolezney (zav. - prof. I.I.Levin)
Dnepropetrovskogo meditsinskogo instituta i pervoy gorodskoy
infektsionnoy bol'nitsy (glavnyy vrach F.K. Hyushko).
(POLIOMYELITIS, compl.

acute facial nerve paralysis (Rus))
(FACIAL PARALYSIS, etiol & pathogen.
poliomyelitis (Rus))

PERLINA, F. M.

Perlina, F. M. "On the problem of disturbance to the body system in peripheral trauma," *Nevrofiziologiya i psikhofiziya*, 1949, No. 2, p. 32-34.

SG: U-3736, 21 May 53, (Letopis 'Znannya i Spokoinn'ostey, No. 17, 1949).

PERLINA, F. M.

IA 61/49T58

<p>USDA/Medicine - Nerve Diseases Medicine - Trauma - Complications and Sequels Mar/Apr 49</p>	<p>"The Problem of Functional Disturbances of the Body Due to a Peripheral Trauma," F. M. Perlina, Cand Med Sci, 3 pp</p>	<p>"Neuropathol 1 Pathinat" No 2</p>	<p>Reports observation on cases with loss of reali- zation of a person's own body, his condition, the occurrence of a feeling of additional parts of the body, etc. Clinico-anatomical studies indi- cate existence of a close relationship of this</p>	<p>RND</p>	<p>61/49T58</p>
<p>USDA/Medicine - Nerve Diseases (Contd) Mar/Apr 49</p>	<p>syndrome with certain parts of the brain. Sub- mitted 31 Jul 46.</p>	<p>RND</p>	<p>61/49T58</p>		

PERLINA L. P.

USSR/ Microbiology - Sanitary Microbiology.

F-3

Abs Jour: Ref Zhur-Biol., No 9, 1958, 38421

Author : ~~Perlina, L. P.~~

Inst : ~~Not given~~

Title : Morphological and Biological Properties of Pyogenic
Microorganisms Found in Maternity Homes.

Orig Pub: Sb. nauchn. rabot. Mold. otd. Vses. nauchn. o-va
mikrobiol., epidemiol. i infektsionistov, 1956,
No 1, 27-36.

Abstract: After a review of the literature, results are given
of studying 792 strains of staphylococci and 194
strains of β -hemolytic streptococci. A compara
tive study of different biological properties of

Card 1/2

PERLINA, L. P. Cand Med Sci -- (diss) "~~The~~ Factors of ~~the~~ Intra-
~~Ward~~ ~~Infection~~ Infection in Maternity ~~Hospital~~ ^{Homes.}" Kishinev, 1957.
15 pp 22 cm. (Kishinev State Medical Inst), 200 copies
(KL, 17-57, 100)

- 74 -

PERLINA, L.P.

PERLINA, L.P.

Studying microflora of the air in a lying-in hospital by using
an aerocentrifuge. Vrach.delo suplement '57:105-106 (MIRA 11:3)

1. Kafedra mikrobiologii (nauchnyy rukovoditel'-prof. S.S.Rechmenskiy)
Kishinevskogo meditsinskogo instituta.
(AIR--BACTERIOLOGY)

1. ZAKRZNEVS'KYI, IL. B. Docent; FINELINA, R. IE.; SAYENKO, A. I.
2. USSR (600¹)
4. Influenza
7. Changes in the blood and bone marrow in grippe, Medych. zhur., 22, no. 1, 1952.
9. Monthly List of Russian Accessions, Library of Congress, April 1953, Uncl.

USMANOV, Kh.U.; PERLINA, R.V.

Determination of aldehyde and carboxyl groups in cellulose preparations. Uzb.khim.zhur. no.4:22-31 '61. (MIRA 14:8)

1. Institut khimii polimerov AN UzSSR. 2. Chlen-korrespondent
AN UzSSR (for Usmanov).
(Cellulose) (Aldehydes) (Carboxyl group)

L 23329-56 EWT(m)/ENP(j)/T/ETC(m)-6 WW/RM

ACC NR: AP6006975

SOURCE CODE: UR/0190/66/008/002/0231/0234

AUTHORS: Yuldashev, A.; Perlina, R. V.; Sadykov, M. M.; Usmanov, Kh. U.ORG: Scientific Research Institute of Chemistry and Technology of Cotton Cellulose
(Nauchno-issledovatel'skiy institut khimii i tekhnologii khlopkovoy tsellyulozy)

TITLE: Phosphorylation of modified cellulose preparations with phosphoric chloroanhydrides

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 8, no. 2, 1966, 231-234TOPIC TAGS: cellulose plastic, phosphorylation, organic phosphorus compound

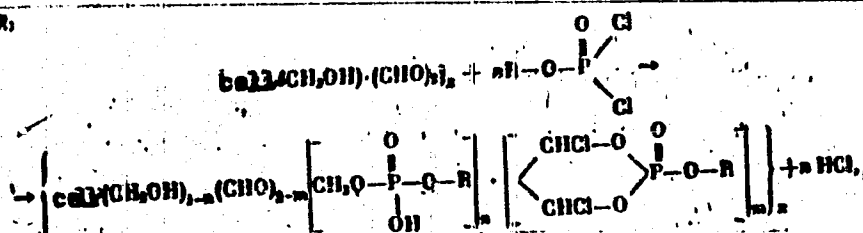
ABSTRACT: The effect of a small amount of aldehydic or primary hydroxyl groups present in position 2 and 3 of cellulose (I) upon the phosphorylation process of I with phosphoric dichloroanhydride (II) has been investigated. The reagents in the ratio I:II = 1:3 were reacted in 30 ml of benzene and 10 ml of pyridine at 75--80C for 30 minutes. The reactivity of the various cellulose preparations toward phosphorylation was determined from the amount of P taken up during the reaction. Phosphorylation of the native cellulose was described, and the mechanism was suggested by Wu. Mei-yan, T. A. Zharova, and Z. A. Rogovin (Zh. prikl. khimii, 35, 1820, 1962). Phosphorylation of the modified cellulose proceeds according to the following schemes:
a) oxidized cellulose

Card 1/2

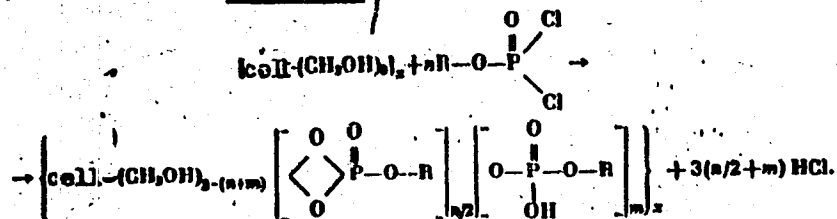
UDC: 661.728.87

L 23329-66

ACC NR:



b) oxidized, then reduced, cellulose



It was established that the presence of aldehydic groups lowers the reactivity of the cellulose toward phosphorylation, while the presence of primary hydroxyl groups doubles it. The product obtained in the latter case is fireproof. Orig. art. has: 3 tables and 4 equations.

SUB CODE: 07/

SUBM DATE: 23Feb65/

ORIG REF: 011/

OTH REF: 002

Cord 2/2

PERLINA, S.

"An X-Ray Study of the Structure of Benzoyl Peroxide,"

Dok. AN, 47, No. 1, 1945. X-Ray Structure Lab. Moscow

Mendeleyev Inst. Chem. Technology. -c1944-.

1st AND 2nd DEGREE		3rd AND 4th DEGREE	
<p>PROCESSING AND PROPERTIES INDEX</p> <p>X-ray study of the structure of benzoyl peroxide. V. Karatichin, S. Pulin, and K. Abramova (Moscow Mendeleev Institute of Chemical Technology). <i>Compt rend. acad. sci. U. R. S. S.</i> 47, 36-8 (1945); <i>Doklady Akad. Nauk S. S. R.</i> 47, 37-0 (1945). Analysis of Laue diffraction patterns and rotation and oscillation diagrams for Bz_2O_2 in the symmetry class D_{2h} and the elementary cell dimensions (in Å): $a = 8.91$, $b = 9.45$, $c = 14.51$, with an axis ratio $a:b:c = 0.622:1:0.600$. The no. of mols. in a cell is four. The calcd. d. is 1.328 as compared to an observed value of 1.334. Bz_2O_2 should be ascribed the sym. elongated structure:</p> <div style="text-align: center;"> </div> <p>where l_c $a = 1.47$ Å, l_c $b = 1.45$ Å, l_c c (for the aliphatic bond) = 1.54 Å, l_c c (for the benzene ring) = 1.41 Å, and where l_c $c = 3.0$ Å is the shortest distance between the C atoms of adjacent unassociated mols. along the c axis. The valence angle in the peroxide group is calcd. as $113^\circ 15'$. In the lattice the 4 elongated mols., with their peroxide groups in close contact, form an assoc. active bromides are those of metals of the 2nd and 3rd groups.</p> <p style="text-align: right;">(G. M. Kozlovskii)</p>			
<p>ASSOCIATED METALLURGICAL LITERATURE CLASSIFICATION</p> <p>FROM SOURCE</p> <p>SELECT ONE ONLY</p>			

BC

X-Ray study of the structure of benzoyl peroxide. V. Kasatotschkin, S. Pavlov, and K. Ablesova (Compt. rend. Acad. Sci. U.R.S.S. 1948, 67, 28-30). -- Bz_2O_2 is rhombic with $a = 8.91, b = 9.48, c = 14.38 \text{ \AA}$. $a:c:b = 0.612:1:0.660$; 4 mols. per unit cell; $\rho = 1.336, \rho_{\text{calc}} = 1.328$; space-group $D_2(P_{2121})$, in agreement with the symmetrical structure Bz-O-O-Bz . A structure diagram and interat. distances are given. F J G

ASD S.L.A. METALLURGICAL LITERATURE CLASSIFICATION

1948-1950

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

BC

11

X-Ray study of the structure of benzoyl peroxide. V. Kasatotschkin, S. Parina, and K. Ablesova (*Compt. rend. Acad. Sci. U.R.S.S.*, 1949, 67, 28-30). — $\text{C}_{14}\text{H}_{10}\text{O}_4$ is rhomboic with a 0.91, b 0.63, c 1.63 Å, $\alpha = \beta = \gamma = 90^\circ$; $d(100)$, 4 molecules per unit cell, ρ 1.336, ρ_{calc} 1.326, space group $D_2h(196)$, in agreement with the symmetrical structure determined by X-ray diffraction diagram and interatomic distances are given.

AND S.L.A. METALLURGICAL LITERATURE CLASSIFICATION

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GOLODOVSKIY, Yakov Yeoshmyevich; ISPOLATOV, Yuriy Veniaminovich;
KALAMKAROV, Rafael' Grigor'yevich; PODKOLZIN, Aleksey Vasil'yevich;
RUMYANTSZV, Vladimir Alekseyevich; PERLINA, V.S., red.;
OKUNEV, Yu.K., podpolkovnik, red.; MKDNIKOVA, A.N., tekhn.red.

[The ZIL-157 motortruck] Avtomobil' ZIL-157. Moskva, Voen.
izd-vo M-va obor.SSSR, 1960. 327 p. (MIRA 13:11)

1. Russia (1923- U.S.S.R.) Avtotraktornoye upravleniye.
(Motortrucks)

PERLINSKA, Krystyna, mgr.inz.

Are the plant laboratories working badly? Przegl papier 18 no.2:
57 F '62.

1. Ostrolecka Fabryka Celulozy i Papieru, Ostroleka.

PERLINSKA, L.

BORECKA, D.: DOŁĘŻKO, H.: KLEPACKI, W., KRANCZYŃSKA, H., MIERZEJEWSKI, M.
NARBUTOWICZ, B. PARNAS, J.: PERLINSKA, L., STASKIEWICZ, J.

Research on etiology of infantile diarrhea in Lublin region. *Pediat. polska* 30 no.3:231-242 Mr '55.

1. Z Zakładu Mikrobiologii keraskiej A.M. w Lublinie, Kierownik:
prof. dr J. Parnas; Z. Kliniki Chorob Dziecięcych, A.M. w Lublinie,
Kierownik: prof. dr med. W. Klepacki, Lublin, Stalingradzka, 85.
Zakł. Mikrobiologii Lek. A.M.

(DIARRHEA, in infant and child
bacteriol. eticle in Poland)